

## Case Report

# Late presentation of branchial cyst

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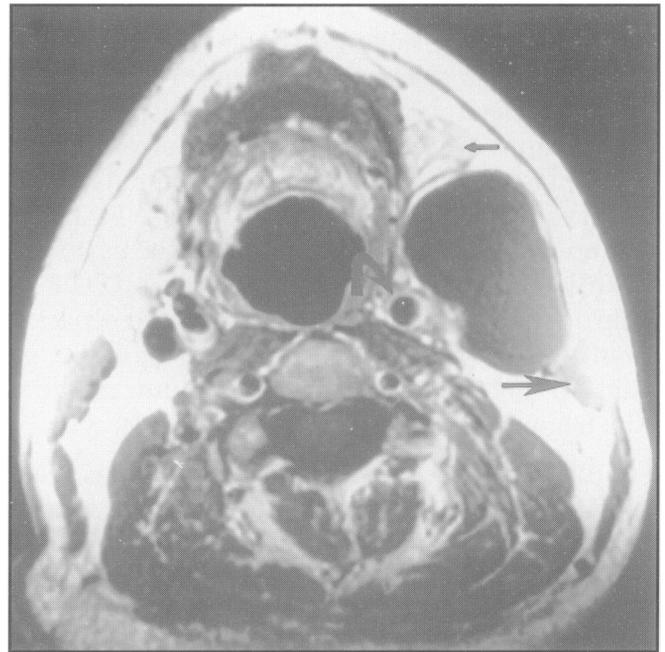
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Branchial cyst is a common cause of a soft tissue swelling in the neck of a young adult. In older adults, with this presentation, it is important to exclude metastatic lymphadenopathy, lymphoma or tuberculosis. We report a branchial cyst which presented in a fifty nine year old male, with typical ultrasound and magnetic resonance (M.R.) appearances leading to the correct radiological diagnosis.

**CASE REPORT** A fifty-nine-year-old man was referred with a twelve month history of a swelling in the left side of his neck. He reported that the swelling varied in size with time. It was never painful nor inflamed. He had occasional pains in his left shoulder radiating into his neck, but this was relieved with anti-anginal medication. He was a non-smoker. There was no associated hoarseness, dysphagia, dizziness or blackouts and he had no intraoral pain or ulceration. His general health otherwise was unremarkable.

On physical examination, the neck lump was soft, fluctuant, non tender and pulsatile measuring 4x5 cm in size. It was situated in the left anterior triangle, inferior to the angle of the mandible, superficial to the left carotid artery and anterior to the upper third of the sternomastoid muscle. There was no associated submandibular or parotid swelling and it was not related to the thyroid gland. Examination of the mouth, nose, sinuses, pharynx and larynx was normal.

Biochemical and haematological blood profiles, including an erythrocyte sedimentation rate, were normal. A doppler ultrasound scan (7.5 MHz, 5.5 cm, linear array) of the neck showed a normal left carotid artery. The jugular vein was displaced laterally, and compressed, by a mass 4.2 cm in length and 1.5 cm in depth. The mass was of low to medium-level echogenicity and appeared cystic rather than solid.



*Fig 1.* Axial T1 weighted MR image. Note submandibular gland (short arrow), sternomastoid muscle (long arrow) and carotid sheath (curved arrow). The cyst fluid is characteristically of low intensity on T1 weighted images. The cyst wall does not enhance following Gadolinium-DTPA.

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An M.R. scan (1.5 Tesla magnet) was then requested to identify more clearly the margins of the mass and its relationship to the underlying vessels. Coronal and axial T1 weighted (Repetition time (TR) 640 ms/Echo time (TE) 11ms) images were obtained followed by axial STIR (Short T1 inversion recovery; Time from inversion (TI) 150 ms/TE 85 ms/TR 6000 ms) images. Following intravenous Gadolinium-DTPA (Diethylene triaminepentacetic acid) contrast enhancement, axial T1 weighted images were obtained.

These confirmed the presence of a large, well-defined, rounded mass in the posterior submandibular space, the contents of which were of fluid signal intensity. There was displacement of the submandibular gland anteriorly, the sternomastoid posteriorly and the contents of the carotid sheath postero-medially (Figure 1). There was no evidence of enhancement of the cyst wall following intravenous Gadolinium-DTPA. Inferomedially the mass was difficult to separate from a displaced, compressed and thrombosed internal jugular vein. The appearances were consistent with a second branchial cleft cyst.

The cyst was surgically excised. A sinus tract extended superiorly between internal and external carotid arteries and was ligated. The left tonsil appeared to be inflamed and was removed. Histopathological examination confirmed a branchial cyst lined by squamous epithelium and containing copious lymphoid tissue in the wall, and an inflamed tonsil (Figure 2). No granuloma formation, caseation necrosis or atypical cells were evident.

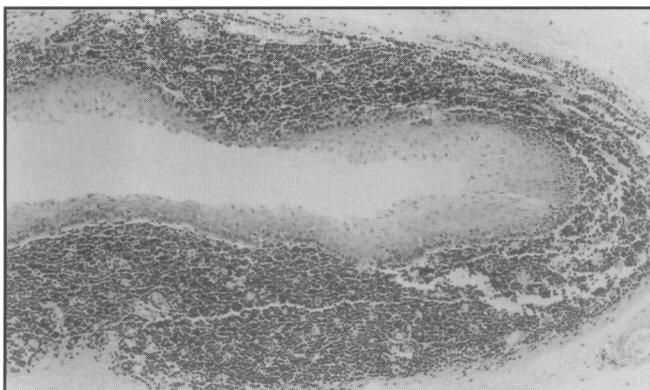


Fig 2. Histopathological section of cyst wall. The branchial cyst is lined by squamous epithelium and contains lymphoid tissue within the wall. There is no evidence of cellular atypia or granuloma formation.

## DISCUSSION

Branchial cyst is the commonest cystic lesion occurring in the neck. There are four theories of origin of branchial cysts.<sup>1</sup> Embryologically, they may represent remnants of pharyngeal pouches or branchial clefts or a fusion of these two elements (present in a two to nine week embryo). Alternative theories include remains of the cervical sinus of His, formed when the second arch grows down to meet the fifth arch, hence "lateral cervical cyst". The "Thymopharyngeal duct theory" is less convincing.

King *et al* proposed the "Inclusion theory" that cyst epithelium arises from lymph node squamous epithelium.<sup>2</sup> Much evidence supports the latter. For instance, most branchial cysts contain lymphoid tissue with no internal opening, the peak age incidence is later than expected for a congenital lesion, and a branchial cyst in a neonate is almost unknown.

The peak age incidence for branchial cysts is in the third decade. Typically they present as a swelling in the anterior triangle of the neck adjacent to the angle of the mandible. Sixty percent are in males, sixty percent on the left side. A few cysts have a definite tract to the posterior pillar of the tonsil, but most do not. A sinogram is of value in the former.<sup>3</sup>

In patients over the age of forty years a cystic metastatic node from a primary neoplasm must be excluded.<sup>4</sup> Differential diagnoses include lymphoma, tuberculosis, and, less frequently, lipoma, nerve sheath tumour or carotid body tumour. Branchiogenic carcinoma is also well documented in the literature. In this condition, neoplasia occurs within squamous epithelium of the branchial cyst, in a patient where an undiagnosed primary has been completely excluded.<sup>5</sup>

Branchial cysts typically contain straw coloured fluid consisting of cholesterol crystals and squamous epithelial cells on fine needle aspiration cytology. Histopathologically, these cyst walls contain lymphoid tissue with evidence of germinal centres, which supports the "Inclusion Theory".

Ultrasound of branchial cysts has been reported. Bedami and Athey *et al* describe echogenic layering in the dependent portions of branchial cysts.<sup>6</sup> More recently Reynolds and Wolinski *et al* describe uniform low to medium level echogenicity in cysts which they postulate

represent cholesterol crystals and cellular material.<sup>7</sup> Our documented case conforms with these features, demonstrating low to medium-level echogenicity, but does not show dependent layering. Its relationship to the underlying carotid sheath is well demonstrated by Colour Doppler methods. Computerised tomography confirms the cystic nature of branchial cysts and determines the extent and anatomical relationship.<sup>8</sup>

At present, M.R. scanning provides the optimum diagnostic imaging modality available for patients presenting with lateral neck masses, due to greater inherent tissue contrast resolution and multi-planar imaging techniques.<sup>9</sup> Gadolinium-DTPA contrast is useful in excluding differential diagnoses. Typically, cyst wall enhancement occurs with neoplasia and infective causes such as tuberculosis. Absence of contrast enhancement of the cyst wall, and its site in the posterior submandibular space with characteristic displacement of adjacent structures<sup>10</sup> permitted the correct radiological diagnosis to be made in this case, despite the late age of presentation.

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